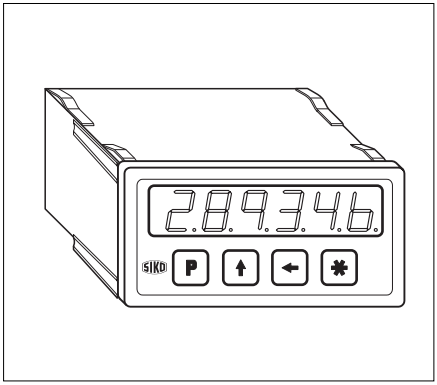
User Information

MA02/1

Electronic Display



ENGLISH

1. Safety information

• In order to carry out installation correctly, we strongly recommend this document is read very carefully. This will ensure your own safety and the operating reliability of the device.

• Your device has been quality controlled, tested and is ready for use. Please respect all warnings and information which are marked either directly on the device or in this document.

• Warranty can only be claimed for components supplied by SIKO GmbH. If the system is used together with other products, the warranty for the complete system is invalid.

• Repairs should be carried out only at our works. If any information is missing or unclear, please contact the SIKO sales staff.

2. Identification

Please check particular type of unit and type number from the identification plate. Type number and the corresponding execution are indicated in the delivery documentation.

e.g. MA02/1-0023

- 0023 — type number
- MA02/1 — type of unit

3. Installation

The unit should be used only according to the protection level provided. Protect the unit, if necessary, against environmental influences such as sprayed water, dust, knocks, extreme temperatures.

Built-in housing EG

• Push the device into the panel (1) until the panel clips (2) hold the housing loosely.

Press the lateral centering (3) slightly down and push the housing into the cut-out (1) until the panel clips (2) snap completely.

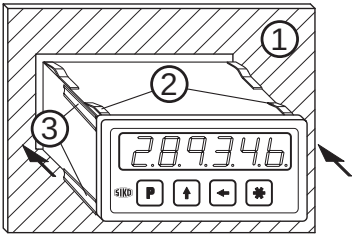


Fig. 1: Installation

Bench housing TG

The rubber feet can be removed in order to screw down the unit.

Attention !Maximum screw insert depth of 6.5 mm must be strictly adhered to!

4. Electrical connection

- Only fix / remove connectors with power off!
- Wiring must only be carried out with power off!
- Provide standed wires with ferrules.
- Check all lines and connections before switching on the equipment.

Interference and distortion

All connections are protected against the effects of interference. **The location should be selected to ensure that no capacitive or inductive interferences can affect the display or the connection lines!** Suitable wiring layout and choice of cable can minimise the effects of interference (eg. interference caused by switching power supplies, motors, cyclic controls and contactors).

Necessary steps:

• Only screened cable should be used. Wire cross section is to be at least 0,14 mm², max. 0,5 mm².

• Wiring to screen and to ground (0V) must be via a good earth point having a large surface area for minimum impedance.

• The unit should be positioned well away from cables with interference; if necessary **a protective screen or metal housing must be provided.** The running of wiring parallel to the mains supply should be avoided.

• Contactor coils must be linked with spark suppression.

• PE-connection with 2.5 – 4 mm² via PE-clamp (fig. 2).

Power supply

is made via mains connection on rear of the device. The correct supply voltage is indicated in the delivery documentation:

Eg.:

230 VAC -10% ... +6%

Sensor connection

via 9-poles rear side SUB-D socket (fig. 3).

Attention! No modifiction of the sensor connection, eg. by cable extension, is permitted.

4.1 Connection, Panel Mounting EG

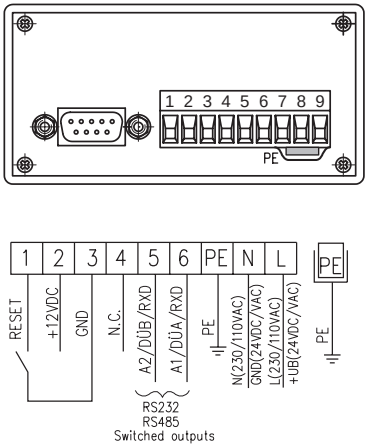
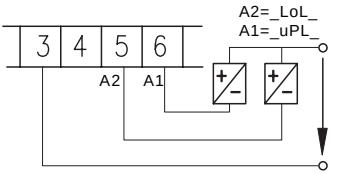


Fig. 2: Pin outs EG

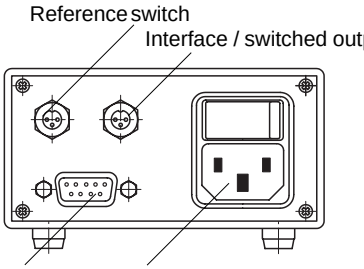
No.	Pin outs
1	RESET
2	U_B = +12V (for reference switch)
3	GND
4	N.C.
5	RS232 (RXD), RS485 (DÜB), A2
6	RS232 (TXD), RS485 (DÜA), A1
7	PE
8	N (230/110 VAC), GND (24 VDC/VAC)
9	L (230/110 VAC), U_B (24 VDC/VAC)

Option: switched outputs

Two open-collector outputs (A1, A2) are available (fig. 2).



4.2 Conn., Bench Top Casing TG



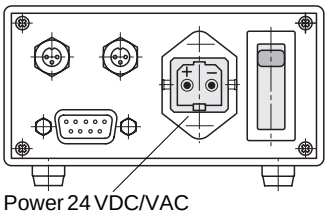


Fig. 3: Rear panel connections TG

Reference switch connection

via a socket at the rear; pin connections are to be made as follows (fig. 3):

No.	Description
1	RFS
2	GND
3	$+U_B$

Interface connection

via a socket at the rear; pin connections are to be made as follows (fig. 3):

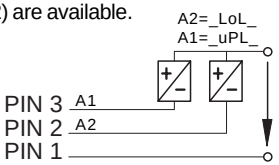
No.	Description
1	GND
2	RXD / DÜB
3	TXD / DÜA

Connection of switched outputs

via a socket at the rear; pin connections are to be made as follows (fig. 3):

No.	Description
1	GND
2	A2
3	A1

Two open-collector outputs (A1, A2) are available.

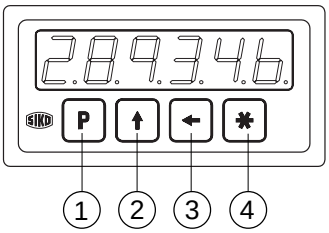


5. Operation

Four membrane keys on the front panel are used for programming and operation of the display.

Keys' function

Depending on the operating mode the keys may have additional functions (see ‚Programming mode' and ‚Input mode'). The keys are pressed singly or in pairs (two together).



1. Programming
2. Select 'value'
3. Select 'digit'
4. Store value

Fig. 4: Key functions

6. Commissioning

and correctly connected:

- all LED segments are displayed (for approx. 1,5 s)
- the software version (eg. 1.00) is displayed

Subsequently the specific parameters of the machine can be programmed.

Operating modes

There are two operating modes accessible via the keyboard:

1. Programming mode: to program the display at initial installation.

2. Input mode: to enter parameters/select functions used during standard operation.

7. Programming mode

The MA02/1 is either pre-programmed to standard values at our works or, if the order defines customer-specific parameters, these will be pre-programmed at SIKO. Normally programming is only necessary at initial installation. Parameters can be modified and checked at any time. They are stored in a non-volatile memory. Each parameter's designation, function and value range is shown in the tables on the following pages.

To change and control parameters:
For parameter modification enter into programming mode.

To enter into programming mode:
Press key P for at least 5 s (pre-programmed) or for the period programmed under _P_S.

To leave programming mode:
Automatically, if no key has been pressed during approx. 30 s, or press key P until the end of the parameter list is reached.

To scroll parameter information:
Use key P

To change parameters:
Use keys ↑ and ←

To store modified parameters:
Press key ✱, then message "-SA-" will be briefly displayed.

8. Parameter description

At the end of this user information brochure you will find a detailed **parameter list** showing all programmable parameters and offering space for customer-specific programming values .

(in English, parameter _LAn_ = "EnGL")

Display "choice"	**Designation / description**
_rES	Resolution: determines the display's resolution. Parameter "**FrEE**" allows the programming of a calculation factor. Value range: 10,1, 0.1, 0.01(mm), 1 n, 0.1 n, 0.01 n, 0.001n (inch), FrEE
FAC	Calculating factor: used to obtain for example an angle display. Basis is the maximal possible resolution of 1/100 mm. The calculation factor which has to be programmed = measuring range to be displayed / total working range [1/100 mm]. *Example:* angle measurement on a circular disk with a display range of 0 to180°; display in 1/10 degrees; circumference of the circular disk 942,48 mm; hence total working range 471,24 mm; FAC = 1800 / 47124 = 0,03820
rEF	Absolute reference point for the measuring system. This value is determined by calibrating the system according to chapter 9
OFF	Offset value: freely programmable value; used to influence the displayed value. Can for example be used as tool correction value. Value range: –99999 ...+99999
_dP_	Decimal point**:** Determination of the decimal point according the resolution. Value range: -199999...+999999
dir	Direction: counting direction of the measuring system
"UP"	upward
"dn"	downward
trS	Reference point source: type of reference switch; can either be a mechanical contact or a proximity switch.
"no"	Closing contact, which is normally open
"nc"	Opening contact, which is normally closed
Sto	Current value memory: stores the last displayed value in the event of power failure
"on"	Current value memory on
"oFF"	Current value memory off
_F_SEt	Reset enable: reset to reference value via key ✱ .
"on"	Reset function on
"oFF"	Reset function off
_F_rEL	incremental measurement enable.
"on"	function on
"oFF"	function off
_F_CAL	Ref. value input enable: to enter / change calibration value.
"on"	Reference value change on
"oFF"	Reference value change off
_F_OFF	Offset input enable: to enter / change offset value (ie. tool correction).
"on"	Offset correction on
"oFF"	Offset correction off
_P_S	Delay of Ⓟ-key (3, 5, 10, 20, 30 second) when switching from input to programming mode
LAn	Language: To choose the language displayed
"GEr"	German
"EnGL"	English
bAud	Baud rate: interface's baud rate. In the case of 'Switched outputs' must be programmed to "ActuAt".
uPL **_LoL_**	Upper/lower limiting value: allows upper and lower switch values to be entered when using option **'Switched outputs'.**
CodE	Code input: for special functions

9. Input mode

Reset function via keyboard

• Press key ✱ to set the display to the reference value.

Precondition: Parameter 'Reset enable' (_F_SEt) in programming mode must be programmed to "on", but unit must **not** be left in programming mode (see chapter 6 '**To leave** programming mode').

Reset function via reference input

By short activation (ground switching) of the input RESET eg. by a push button or by using a proximity switch. (type of reference switch must be programmed in the menu point "_trS_")

Incremental measurement

Press the two arrow keys ↑ + ← simultaneously to activate incremental measurement function.

• The display is zeroed.

• Decimal point is blinking.

• Leave incremental measurement function by another simultaneous press of the two arrow keys ↑ + ← . The absolute measuring value is displayed again.

• While in the incremental measurement mode-the display can also be set to zero by pres-sing key ✱ . This does not change the absolute measurement in the background.

Precondition: Menu point 'Incremental measurement enable' (_F_rEL) in programming mode must be programmed to "on", but unit must **not** be left in programming mode (see chapter 6 ,**'To leave** programming mode').

Reference and/or offset value modification

Press the two keys P + ↑ simultaneously to enter a new reference value.

Press the two keys P + ← simultaneously to enter a new offset value.

The display then shows the reference / offset value, which can be changed via the two arrow keys.

Press key ✱ to store the new value.

If no key has been pressed for approx. 30 s or if you press again key P, MA02/1 will return to display mode.display mode.

Precondition: In programming mode menu points 'Reference value input enable' (_F-rEF) 'Offset input enable' (_F_oFF) respectively must be programmed to "on", but unit must **not** be left in programming mode (see chapter 6 ,**'To leave** programming mode').

10. Trouble shooting

Error states are recognized and shown in the display:

Message: Full
Description: display overrun
Action: check parameters and adjust them if necessary; set display to reference value

Message: display blinking
Description: faulty / no sensor signal
Action: check gap between sensor and magnetic strip

Message / Effect: Decimal point blinking / MA02/1 cannot be referenced
Description: Display is still in incremental measurement function
Action: Leave incremental measurement function as descriped in chapter 8 or proceed as follows:
1. Enter into programming mode
2. Program parameter '_F_rEL' to "ON"
3. Leave programming mode
4. Leave incremental measurement function as descriped in chapter 8
5. Enter programming mode again
6. Program parameter '_F_rEL' to "OFF"
7. Leave programming mode

11. List of commands / service operation

Parameters:	4800 Baud, no parity, 8 bit, 1 stop bit, no handshake
Data code:	ASCII
Value ranges:	2/3 byte: 0...65535 / 0...± 2^{23}
- for data input:	both upper and lower case accepted
-for data output:	all reply telegrams are completed by a CR (=hex13); exception: command W

Command	Length	Reply	Description
Ax			Send unit type / software version 2/6
	2/6	"xxxxx>"	x=0:hardware version
	2/6	"xxxxx>"	x=1:software version
B	1/8	"±xxxxxxx>"	Send absolute value (without incremental measurement and offset)
Ey	2/10		"±xxxxxxx>" Issue a 3-byte value y=address (0...4) xxxxxxx=dec. value y=0:position value y=1:zero position value y=2:reference value y=3:offset value y=4:incremental measurement value
Fy±xxxxxx	9/2	">"	Enter 3-Byte value y=address (2...4) xxxxxxx=dec. value y=2:calibration value y=3:offset value y=4:incremental measurement value
G	1/9	"y/xxxxx>"	Issue resolution y = value (0...8) xxxxx = text 0/10 10 mm 1/1 1 mm 2/0.1 1/10 mm 3/0.01 1/100 mm 4/1i 1 inch 5/0.1i 1/10 inch 6/0.01i 1/100 inch 7/0.001i 1/1000 inch 8/frei free factor
Hy	2/2	">"	Enter resolution y=value (0...8); no.-see command "G"
I	1/9	"x.xxxxx>"	Issue free factor
Jx.xxxxx	7/2	">"	Enter free factor format: "X.XXXXX"
K	1/0	""	Software reset
L	1/2	">"	Zero-setting (referencing) of the device
M	1/3	"x>"	Issue number of digits after the comma x=positions after the comma
Nx	2/2	">"	Enter number of digits after the comma x=0...4
Ox	2/2	">"	Enter type of reference switch x=0: closing contact x=1: opening contact
Qx	2/2	">"	Language x=0: German x=1: English
Rxxxx	5/2	">"	Release keyboard xxxx 0=off, 1=on 1st digit: reset via keyboard 2nd digit: increm. measurement 3rd digit: ref. value input 4th digit: offset value input
Sxxxxx	6/2	">"	restore ex-works programming x=11100 (aligment data do not go lost)
Tx	2/2	">"	Counting direction x=0: upward x=1: downward
W	1/3	"xyz"	Binary position value xyz = 3 byte in two's complement MSB...LSB
Xy	2/2	">"	Display test x=0: standard display x=1...3 various tests
Z	1/10	"±xxxxxxx>"	Issue position value

12. Application Examples

Length measurement

Required: Display accuracy 1/10 mm.
Display shall be zeroed via function key.

Display	Designation	Progr.value
rESoL	resolution	0.1
rEF	reference value	0000.0
OFF	offset value	0000.0
_dP_	decimal point	0.0
dir	counting direction	AUF
_F_SEt	reset enable	EIn
_F_rEL	incr. meas. enable	AUS
_F_rEF	reference value enable	AUS
_F_OFF	offset value enable	AUS
_P_S	delay of P key	5
SPr	language	EnGL

Appendix: Parameter list

(in English language, parameter _SPr_ = "EnGL")

Display	Designation / value range	Your programming I	Your programming II
rESoL	resolution: 10,1, 0.1,0.01 (mm) 1 in, 0.1 in, 0.01 in, 0.001in (inch) FrEE		
FAC	calculating factor: (only if resolution has been programmed to "FrEE") 0.00001 ... 2.99999		
rEF	reference value: -199999 ... 999999		
OFF	offset value: -199999 ... 999999		
_dP_	decimal point: 0. bis 0.0000		
_dir	counting direction: UP, dn		
_trS	type of ref.switch: n.o. , n.cl.		
Sto	current value memory: on , oFF		
_F_SEt	reset enable: on , oFF		
_F_rEL	incremental measurement enable: on , oFF		
_F_rEF	reference value input enable: on , oFF		
_F_OFF	offset input enable: on , oFF		
_P_S_	delay of key in seconds: 3, 5, 10, 20, 30.		
SPr	language: GEr, EnGL		
bAud	interface 's baudrate: 300, 600, 1200, 2400, 4800, 9600, 19200, ActuAt		
uPL	upper limiting value: (only if option swichrd outputs "ActuAt") -199999...999999		
LoL	lower limiting value: (only if option swichrd outputs "ActuAt") -199999...999999		

SIKO GmbH
DR.-ING. G. WANDRES

Postanschrift / Postal address:
Postfach 1106
D-79195 Kirchzarten

Werk / Factory:
Weihermattenweg 2
D-79256 Buchenbach

Telefon / Phone 0 76 61 / 3 94 - 0
Telefax / Fax 0 76 61 / 3 94 - 388
Internet www.siko.de